Conexant Systems, Inc.

Audio Config Tool User Guide for CX2098x Rev 0.1

Introduction:

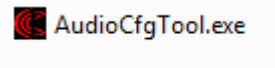
Conexant Systems, Inc. (Conexant) provides the “USB Audio Configuration Tool” to support the configuration and tuning of the CX2098x family of USB audio CODECs.

Starting:

Put the ‘USB Audio Configuration Tool – 3.16.0.0.exe’ in a folder on a Windows PC.

Plug in a USB cable between the CX2098x device and the host PC.

Open USB Audio Configuration Tool – 3.16.0.0 by clicking on the icon.



The follow GUI will open on screen.

You can change the Vendor ID, Device ID, UCQ String, Manufacturer, Product Name as well as Revision ID (numeric value). Terminal types can be configured by clicking on the selectable menu.

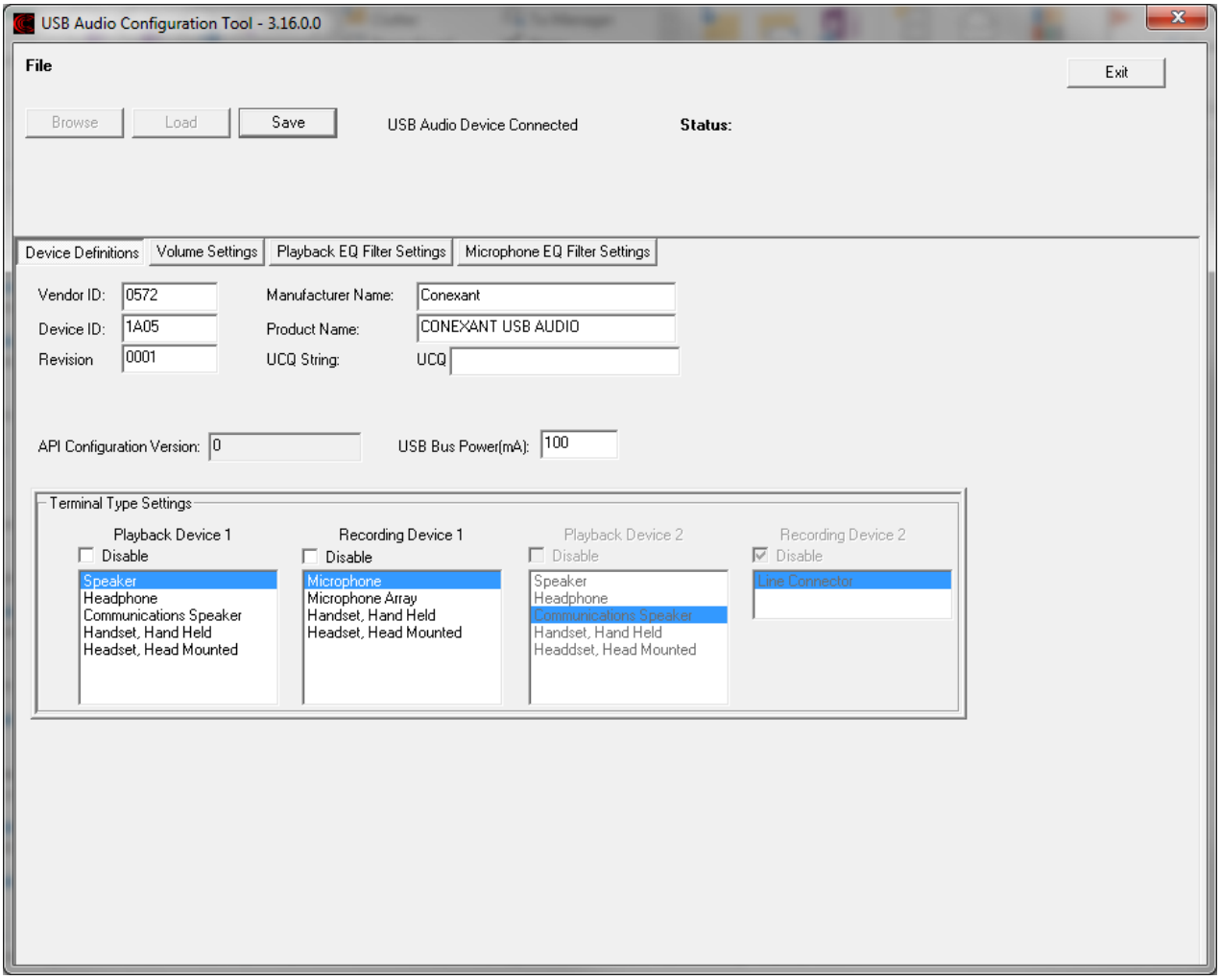


Figure 1: CX2098x Audio Config Tool --- Device Definitions

Click on the “Volume Settings” tab. The end user is free to change the volume steps of playback and recording.

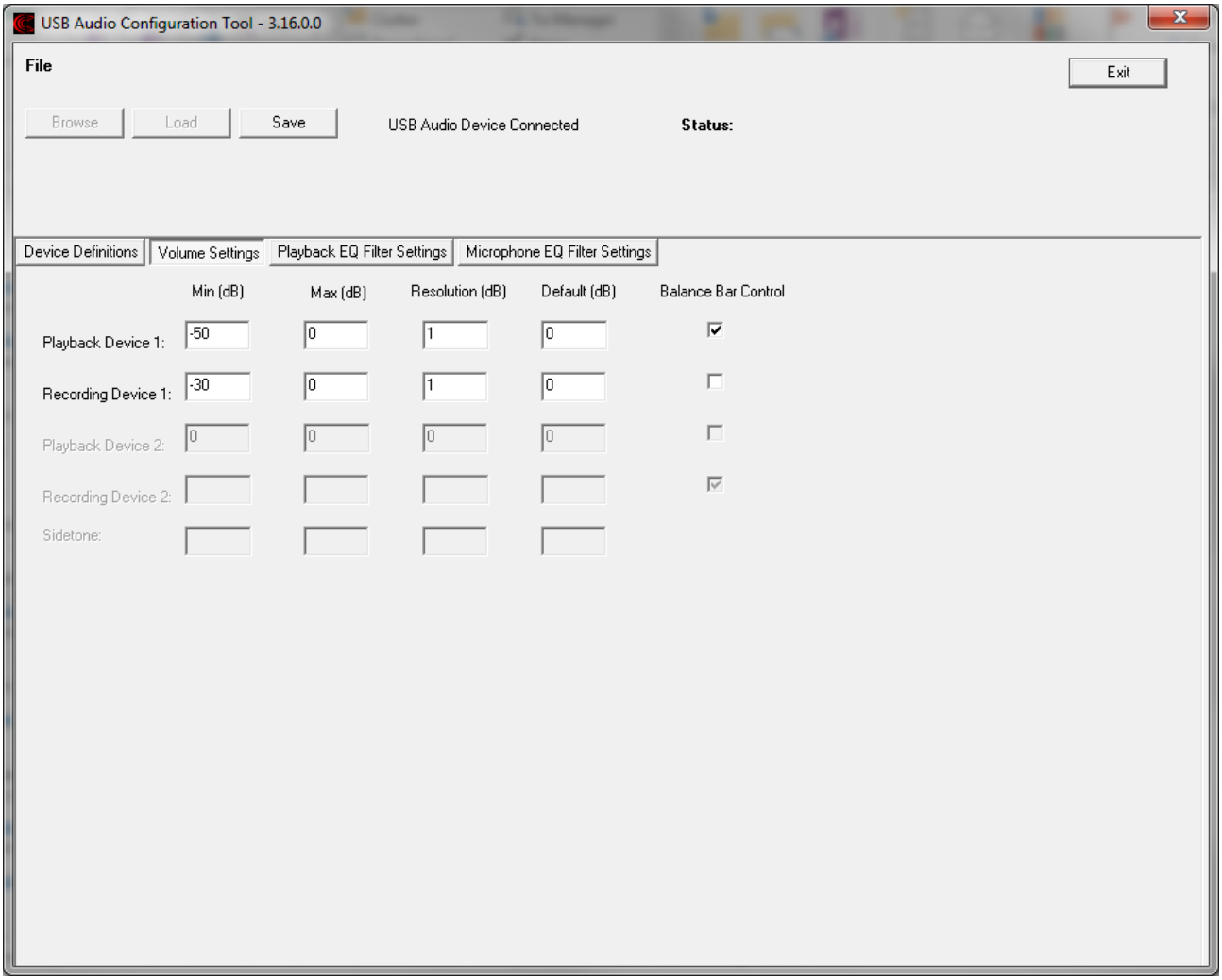


Figure 2: CX2098x Audio Config Tool --- Volume Settings

For the rest of this User Guide, we will focus on tuning the “Playback EQ Filter Settings” and “Microphone EQ Filter Settings”

Tuning the Playback EQ

Click on the “Playback EQ Filter Settings” tab.

Select the playback sample rate. In our case, we have a clip of 44.1k sample rate, therefore, we will use the 44.1k sample rate for our EQ.

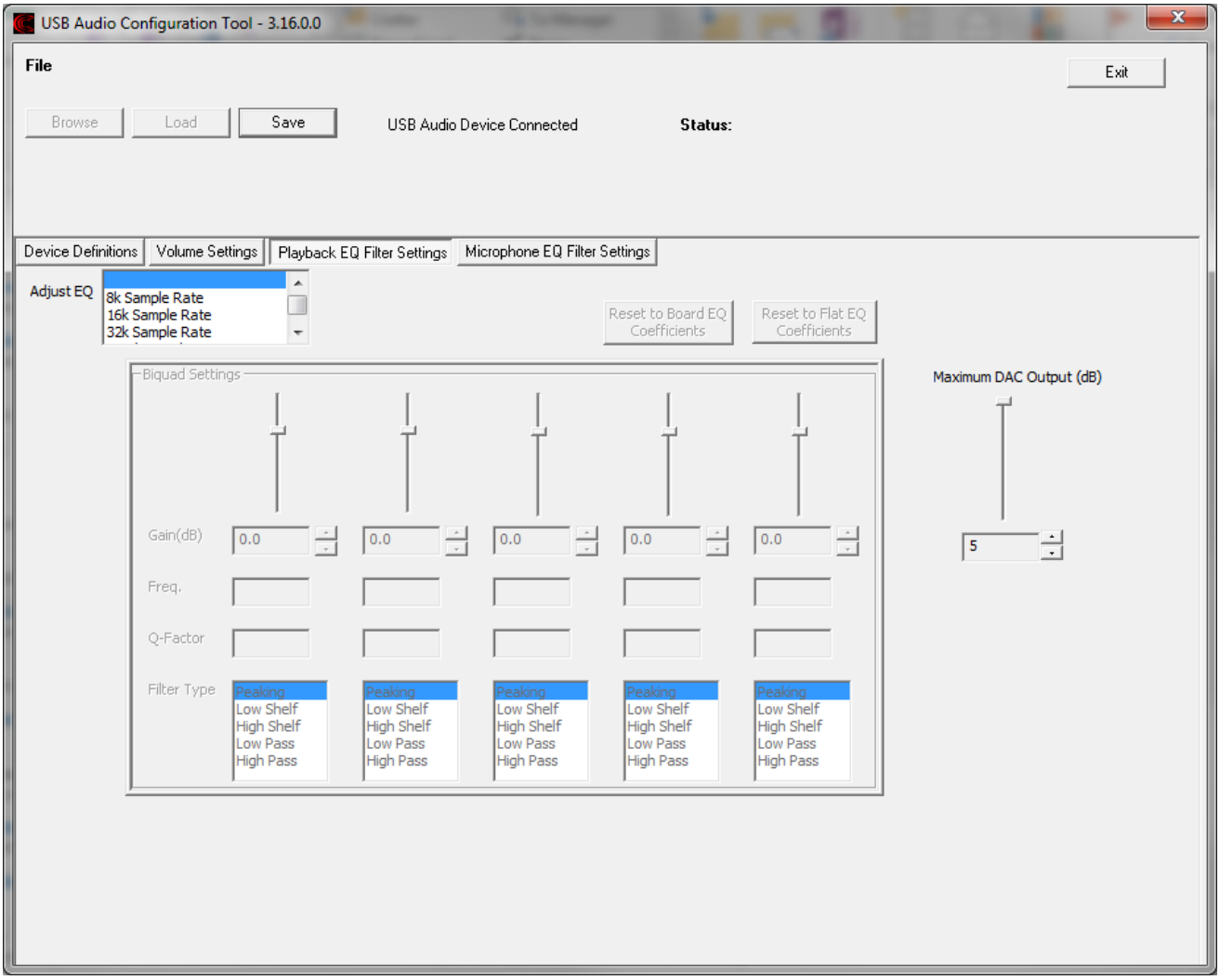


Figure 3: Playback EQ tuning panel (un-activated)

Once desired sample rate has been selected, the “Biquad Settings” will be activated (not greyed out). See Figure 4 below.

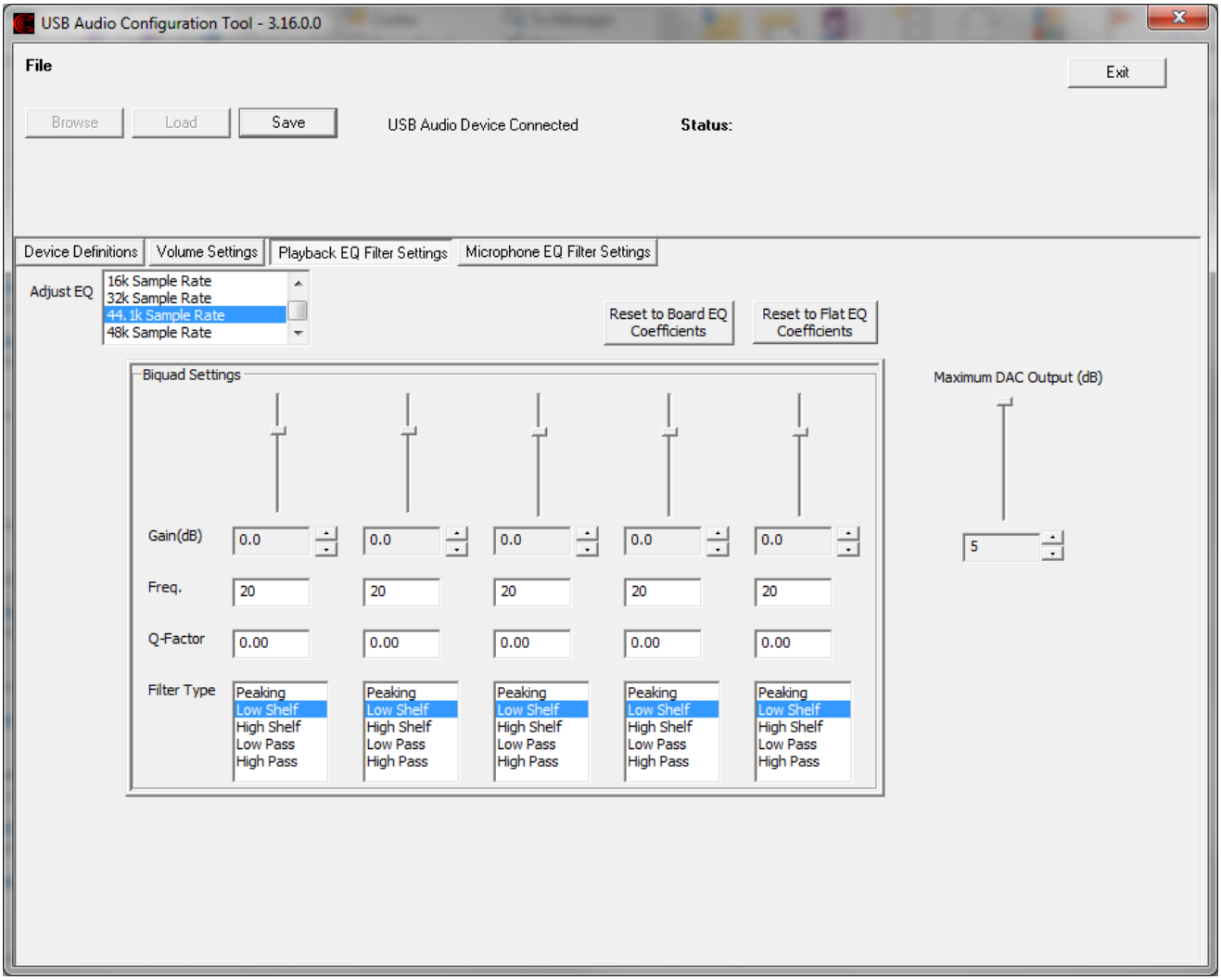


Figure 4: Playback EQ tuning panel (activated)

Make desired changes by entering the Gain, Frequency, Q-Factor and the Filter Type (Peaking, Low Shelf, High Shelf, Low Pass, High Pass). See Figure 5 below as an example.
Note that, the Max DAC Output on the right hand side can limit the max playback level. It ranges from a max of 5dB to a min of -74dB (very close to mute). While music or speech is being played, one can hear the effects of the EQ or max DAC output slider.

A “pop” noise can be heard during the adjustment of the tuning parameters, and is considered normal. Once the adjustments are made, no further pop noise should be heard through headphone playback.

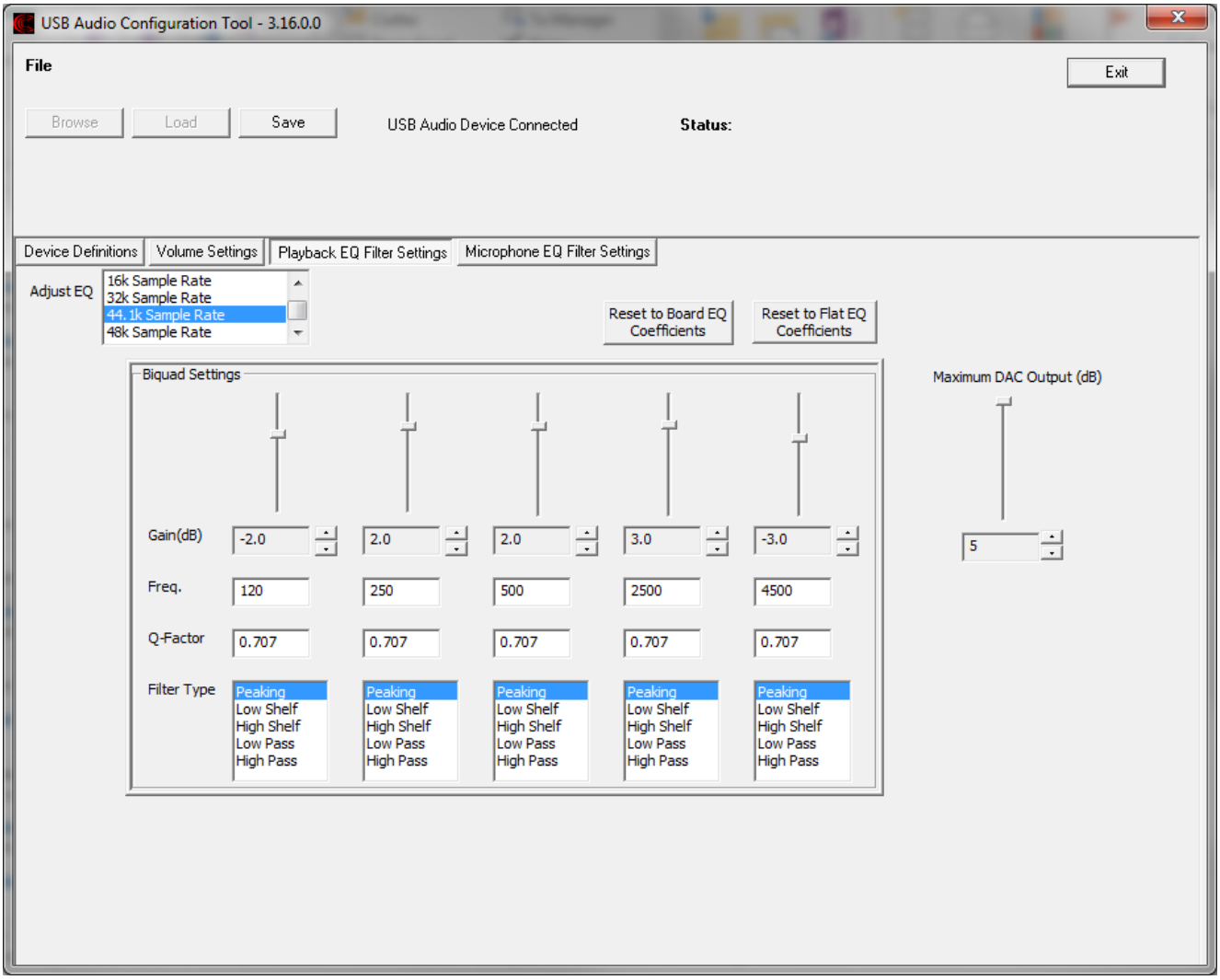


Figure 5: Playback EQ tuning.

Tuning the microphone (recording path) EQ:

There are two panels on the mic tuning panel, namely:

a. Microphone Gain Settings (see below)

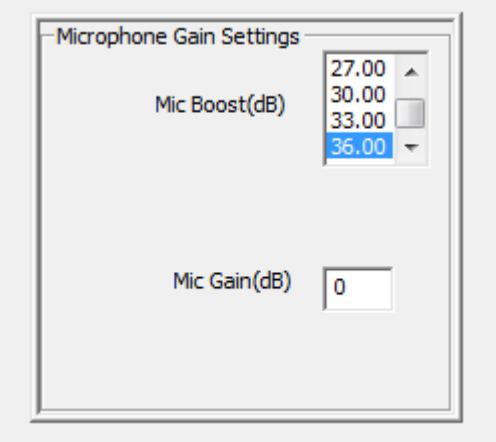


Figure 6: Mic boost and mic gain.

b. Biquad Settings (See below)

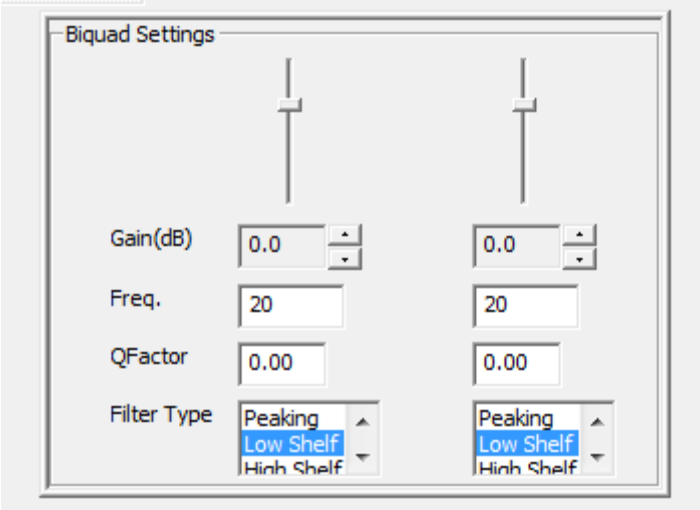


Figure 7: Mic Biquad cascade EQ.

The Mic Boost (in dB) can be adjusted in steps of 3dB. This is the analog boost of the microphone (amplified before the microphone ADC). Depending on the sensitivity of the microphone, Conexant recommends a boost in the range of 30 – 36dB. The Mic Gain (in dB) is a post analog-to-digital converter (ADC) digital gain that can be incremented / decremented in steps of 1dB. This allows gains to be fine tuned to compensate for the lack of fine granularity of mic boost. Since it is a digital gain, the signal along with noise, will be amplified by this gain.

Therefore, Conexant recommends that a suitable mic boost should be attained before tuning mic gain. A general guideline is, <= +/-3dB of mic gain be applied.

As for the mic EQ tuning, the CX2098x has a cascade bi-quad EQ for the microphone. Below is an example of a: 250Hz, Peaking filter, Q=0.707, 3dB Gain and 1200Hz, Peaking filter, Q=0.707, -1dB Gain, in cascade.

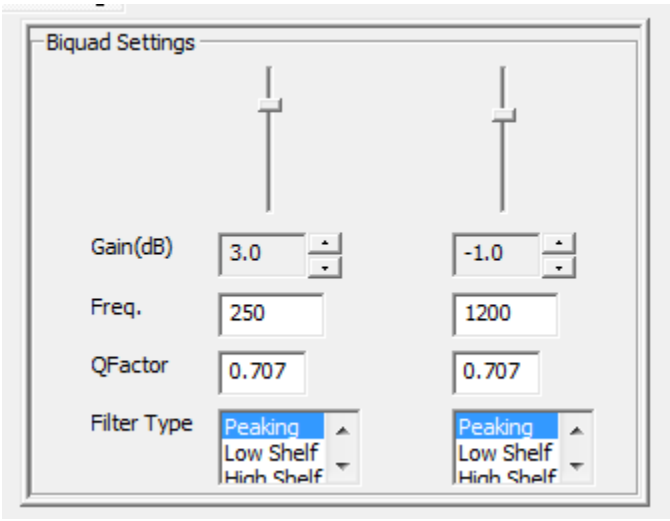


Figure 8: Mic Biquad cascade EQ, tuned.

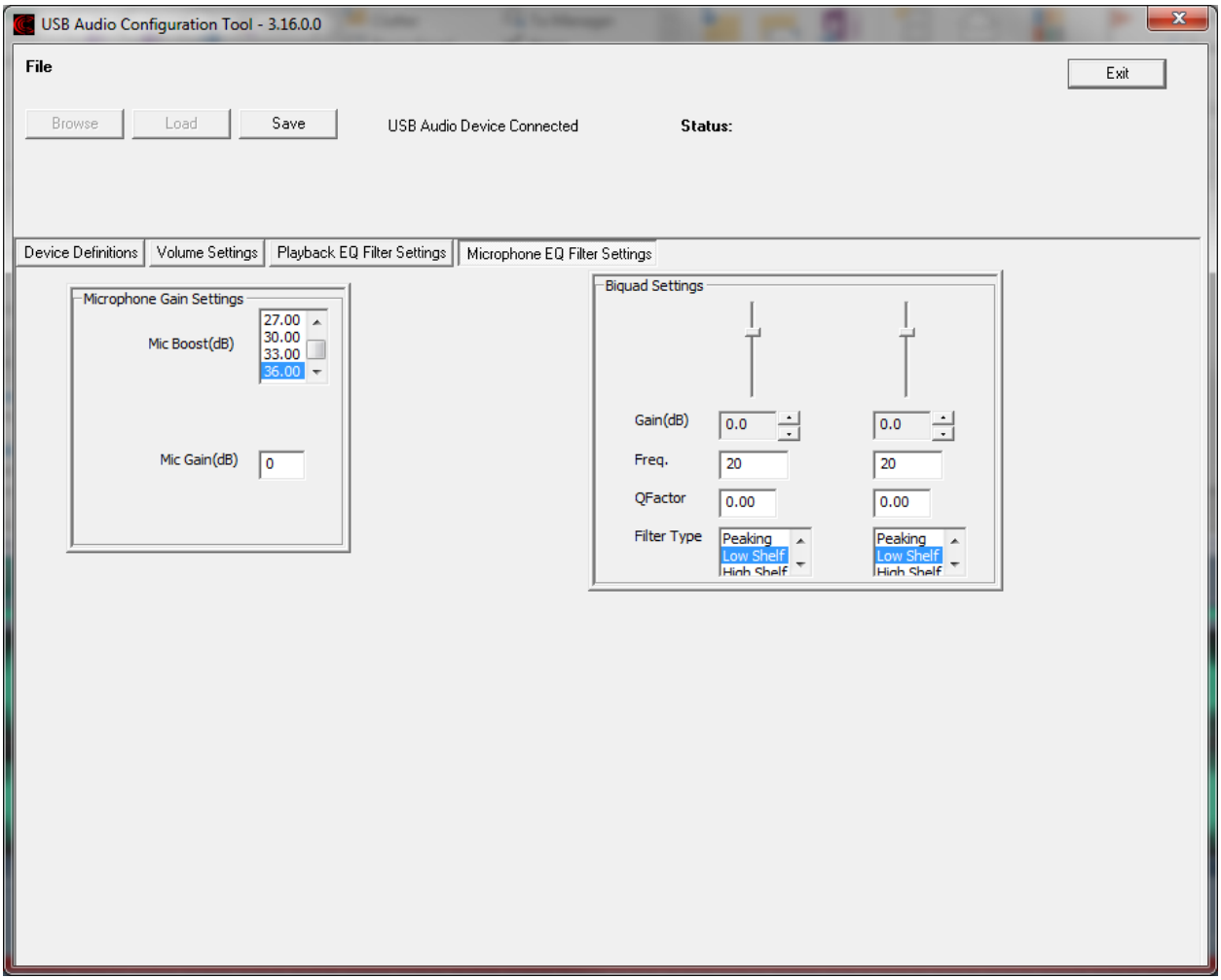


Figure 9: Microphone EQ Filter Settings and Mic Gain Settings Tab.

When tuning is done, be sure to save the tuning parameters before clicking “Exit”.

Click on the “Save” button and a window will pop up, prompting the user to save the work so far. Type in a name (with no space in between, only alphanumerics). In our example, we use: CX20985_Tune1, and click save.

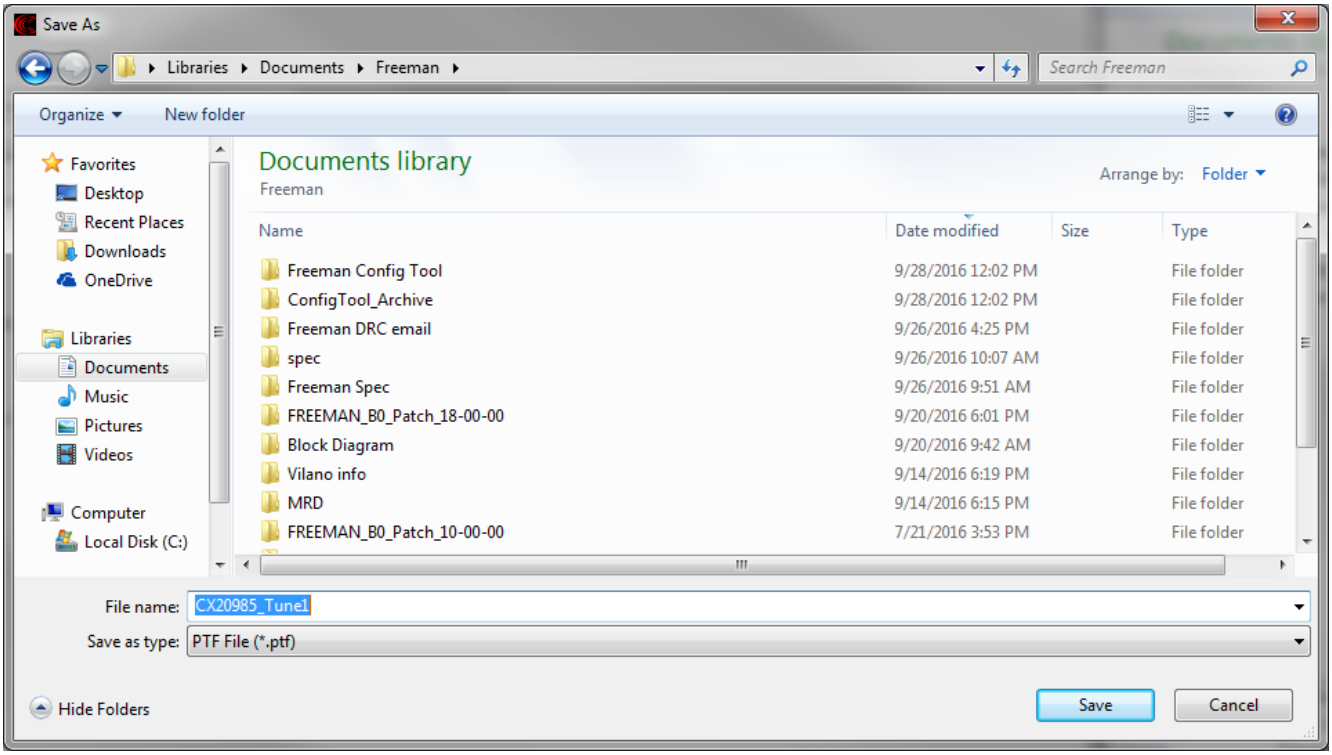


Figure 10: Saving Tuning Parameters and saving the new firmware.

The windows will disappear after saving and there will be three files generated, namely:

CX20985_Tune1.asm

CX20985_Tune1.pcf

CX20985_Tune1.ptf

Click “Exit” to exit the ‘AudioCfgTool.exe’

After exiting the ‘AudioCfgTool.exe’, use the Conexant provided: UpgradeFirmware-1.0.55.0.exe tool to load the newly generated firmware: ‘CX20985_Tune1.ptf’. Upon completions, power cycle the CX2098x device, and upon power-up, the Cx2098x device will have the new tuning parameters.

If further tuning is desired, repeat the above tuning procedure and give the new tuning parameters a new file name, say, CX20985_Tune2 etc.

When you are satisfied with your tuning results, please provide the .asm, .ptf and the .pcf files to Conexant, and we will build you an official firmware release for your production needs.

Conclusion

This concludes this User Guide. We welcome your feedback, corrections, recommendations. Please contact your Conexant field applications engineer for further support.

Thank you!